

Calendar No. 255116TH CONGRESS
1ST SESSION**S. 1602****[Report No. 116-135]**

To amend the United States Energy Storage Competitiveness Act of 2007 to establish a research, development, and demonstration program for grid-scale energy storage systems, and for other purposes.

IN THE SENATE OF THE UNITED STATES

MAY 22, 2019

Ms. COLLINS (for herself, Mr. HEINRICH, Ms. SMITH, Mr. GARDNER, Mr. COONS, Ms. MCSALLY, Mr. KING, Mr. CRAPO, Ms. STABENOW, Ms. HIRONO, Mr. MANCHIN, Ms. KLOBUCHAR, Ms. HASSAN, Mr. WHITEHOUSE, Mr. REED, Ms. CORTEZ MASTO, Mr. WYDEN, Ms. DUCKWORTH, and Ms. MURKOWSKI) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

OCTOBER 22, 2019

Reported by Ms. MURKOWSKI, with an amendment and an amendment to the title

[Strike out all after the enacting clause and insert the part printed in *italic*]

A BILL

To amend the United States Energy Storage Competitiveness Act of 2007 to establish a research, development, and demonstration program for grid-scale energy storage systems, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
 2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “Better Energy Storage
 5 Technology Act” or the “BEST Act”.

6 **SEC. 2. GRID-SCALE ENERGY STORAGE SYSTEM RESEARCH,**
 7 **DEVELOPMENT, AND DEMONSTRATION PRO-**
 8 **GRAM.**

9 (a) IN GENERAL.—The United States Energy Stor-
 10 age Competitiveness Act of 2007 (42 U.S.C. 17231) is
 11 amended—

12 (1) by redesignating subsections (l) through (p)
 13 as subsections (m) through (q), respectively; and

14 (2) by inserting after subsection (k) the fol-
 15 lowing:

16 “(1) GRID-SCALE ENERGY STORAGE SYSTEM RE-
 17 SEARCH, DEVELOPMENT, AND DEMONSTRATION PRO-
 18 GRAM.—

19 “(1) DEFINITIONS.—In this subsection:

20 “(A) ENERGY STORAGE SYSTEM.—The
 21 term ‘energy storage system’ means a system,
 22 equipment, facility, or technology that—

23 “(i) is capable of absorbing energy,
 24 storing that energy for a period of time,
 25 and dispatching the stored energy; and

1 “(ii)(I) uses a mechanical, electrical,
2 chemical, electrochemical, or thermal pro-
3 cess to store energy that—

4 “(aa) was generated at an earlier
5 time for use at a later time; or

6 “(bb) was generated from a me-
7 chanical process, and would otherwise
8 be wasted, for delivery at a later time;
9 or

10 “(II) stores thermal energy for direct
11 use for heating or cooling at a later time
12 in a manner that avoids the need to use
13 electricity at that later time, in the same
14 manner as the storage and use offered by
15 a grid-enabled water heater.

16 “(B) PROGRAM.—The term ‘program’
17 means the research, development, and dem-
18 onstration program established under para-
19 graph (2)(A).

20 “(2) ESTABLISHMENT.—

21 “(A) IN GENERAL.—Not later than 180
22 days after the date of enactment of the BEST
23 Act, the Secretary shall establish within the Of-
24 fice of Electricity of the Department of Energy
25 a research, development, and demonstration

1 program of grid-scale energy storage systems,
2 in accordance with this subsection.

3 “(B) GOALS, PRIORITIES, COST TAR-
4 GETS.—The Secretary shall develop goals, pri-
5 orities, and cost targets for the program.

6 “(3) STRATEGIC PLAN.—

7 “(A) IN GENERAL.—Not later than 180
8 days after the date of enactment of the BEST
9 Act, the Secretary shall submit to the Com-
10 mittee on Energy and Natural Resources of the
11 Senate and the Committee on Science, Space,
12 and Technology of the House of Representa-
13 tives a 10-year strategic plan for the program.

14 “(B) CONTENTS.—The strategic plan sub-
15 mitted under subparagraph (A) shall—

16 “(i) identify Department of Energy
17 programs that—

18 “(I) support the research and de-
19 velopment activities described in para-
20 graph (4) and the demonstration
21 projects under paragraph (6); and

22 “(H)(aa) do not support the ac-
23 tivities or projects described in sub-
24 clause (I); but

1 “(bb) are important to the devel-
2 opment of grid-scale energy storage
3 systems and the mission of the Office
4 of Electricity of the Department of
5 Energy, as determined by the Sec-
6 retary; and

7 “(ii) include expected timelines for—

8 “(I) the accomplishment of rel-
9 evant objectives under current pro-
10 grams of the Department of Energy
11 relating to grid-scale energy storage
12 systems; and

13 “(II) the commencement of any
14 new initiatives within the Department
15 of Energy relating to grid-scale energy
16 storage systems to accomplish those
17 objectives.

18 “(C) ~~UPDATES TO PLAN.~~—Not less fre-
19 quently than once every 2 years, the Secretary
20 shall submit to the Committee on Energy and
21 Natural Resources of the Senate and the Com-
22 mittee on Science, Space, and Technology of
23 the House of Representatives an updated 10-
24 year strategic plan, which shall identify, and
25 provide a justification for, any major deviation

1 from a previous strategic plan submitted under
2 this paragraph.

3 “(4) RESEARCH AND DEVELOPMENT.—In ear-
4 rying out the program, the Secretary shall focus re-
5 search and development activities on developing cost-
6 effective energy storage systems that—

7 “(A)(i) to balance day-scale needs, are ca-
8 pable of highly flexible power output for not
9 less than 6 hours; and

10 “(ii) have a lifetime of—

11 “(I) not less than 8,000 cycles of dis-
12 charge at full output; and

13 “(II) 20 years of operation;

14 “(B)(i) can provide power to the electric
15 grid for durations of approximately 10 to 100
16 hours; and

17 “(ii) have a lifetime of—

18 “(I) not less than 1,500 cycles of dis-
19 charge at full output; and

20 “(II) 20 years of operation; and

21 “(C) can store energy over several months
22 and address seasonal scale variations in supply
23 and demand.

24 “(5) COST TARGETS.—

1 “(A) IN GENERAL.—Cost targets developed
2 by the Secretary under paragraph (2)(B)
3 shall—

4 “(i) be for energy storage costs across
5 all types of energy storage technology; and

6 “(ii) include technology costs, installa-
7 tion costs, balance of services costs, and
8 soft costs.

9 “(B) TARGET UPDATES; SUBTARGETS.—
10 Not less frequently than once every 5 years
11 during the 10-year period beginning on the date
12 of enactment of the BEST Act, the Secretary
13 shall—

14 “(i) revise the cost targets developed
15 under paragraph (2)(B) to be more strin-
16 gent, based on—

17 “(I) a technology-neutral ap-
18 proach that considers all types of en-
19 ergy storage deployment scenarios, in-
20 cluding individual technologies, tech-
21 nology combination use profiles, and
22 integrated control system applications;

23 “(II) input from a variety of
24 stakeholders, including the stake-
25 holders described in subsection (i)(3);

1 “(III) the inclusion and use of
2 existing infrastructure; and

3 “(IV) the ability to optimize the
4 integration of intermittent renewable
5 energy generation technology and dis-
6 tributed energy resources; and

7 “(ii) establish cost subtargets for
8 technologies and applications relating to
9 the energy storage systems described in
10 paragraph (4), taking into consideration—

11 “(I) electricity market prices; and

12 “(II) the goal of being cost-com-
13 petitive in specific markets for electric
14 grid products and services.

15 “(6) DEMONSTRATION PROJECTS.—

16 “(A) IN GENERAL.—Not later than Sep-
17 tember 30, 2023, under the program, the Sec-
18 retary shall, to the maximum extent practicable,
19 enter into agreements to carry out not more
20 than 5 grid-scale energy storage system dem-
21 onstration projects.

22 “(B) OBJECTIVES.—Each demonstration
23 project carried out under subparagraph (A)
24 shall be designed to further the development of

1 the energy storage systems described in para-
2 graph (4).

3 ~~“(C) NO PROJECT OWNERSHIP INTER-~~
4 ~~EST.—The Federal Government shall not hold~~
5 ~~any equity or other ownership interest in any~~
6 ~~grid-scale energy storage system that is part of~~
7 ~~a demonstration project under this paragraph.~~

8 ~~“(7) TESTING AND VALIDATION.—The Sec-~~
9 ~~retary shall accelerate the standardized testing and~~
10 ~~validation of grid-scale energy storage systems under~~
11 ~~the program through collaboration with one or more~~
12 ~~National Laboratories (as defined in section 2 of the~~
13 ~~Energy Policy Act of 2005 (42 U.S.C. 15801)), in-~~
14 ~~cluding by developing testing and evaluation meth-~~
15 ~~odologies for—~~

16 ~~“(A) standardized grid performance testing~~
17 ~~for energy storage systems, materials, and tech-~~
18 ~~nologies during each stage of development, be-~~
19 ~~ginning with the research stage and ending with~~
20 ~~the deployment stage, including performance~~
21 ~~testing with charge and discharge protocols to~~
22 ~~evaluate power capability, energy output, and~~
23 ~~degradation during cycling and calendar aging~~
24 ~~on earliest stage commercially viable prototypes~~
25 ~~(commonly less than 100 kilowatts); and~~

1 “(B) accelerated life testing protocols to
2 predict estimated lifetime metrics with accu-
3 racy.

4 “(S) COORDINATION.—To accelerate the devel-
5 opment of grid-scale energy storage systems under
6 the program, and pursuant to subsection (n), the
7 Secretary shall coordinate with—

8 “(A) offices within the Department of En-
9 ergy conducting energy storage research, such
10 as the Advanced Research Projects Agency—En-
11 ergy, the Office of Science, and the Office of
12 Energy Efficiency and Renewable Energy;

13 “(B) Federal agencies that are carrying
14 out initiatives to increase energy security or re-
15 liability, such as the Department of Defense,
16 the National Science Foundation, the Federal
17 Energy Regulatory Commission, and the De-
18 partment of Homeland Security;

19 “(C) program offices that aim to increase
20 domestic manufacturing and production, such
21 as the Office of Advanced Manufacturing in the
22 Department of Energy and the National Insti-
23 tute of Standards and Technology in the De-
24 partment of Commerce; and

1 “(D) members of private industry to ad-
 2 vance the development of commercially viable
 3 grid-scale energy storage systems.”.

4 (b) **AUTHORIZATION OF APPROPRIATIONS.**—The
 5 United States Energy Storage Competitiveness Act of
 6 2007 (42 U.S.C. 17231) is amended, in subsection (q) (as
 7 redesignated by subsection (a)(1))—

8 (1) in paragraph (5), by striking “and” at the
 9 end;

10 (2) in paragraph (6), by striking the period at
 11 the end and inserting “; and”; and

12 (3) by adding at the end the following:

13 “(7) the research, development, and demonstra-
 14 tion program of grid-scale energy storage systems
 15 under subsection (1) \$60,000,000 for each of fiscal
 16 years 2020 through 2024.”.

17 **SECTION 1. SHORT TITLE.**

18 *This Act may be cited as the “Better Energy Storage*
 19 *Technology Act” or the “BEST Act”.*

20 **SEC. 2. DEFINITIONS.**

21 *In this Act:*

22 (1) **DEPARTMENT.**—*The term “Department”*
 23 *means the Department of Energy.*

1 (2) *ENERGY STORAGE SYSTEM.*—The term “en-
2 energy storage system” means any system, equipment,
3 facility, or technology that—

4 (A) is capable of absorbing or converting
5 energy, storing the energy for a period of time,
6 and dispatching the energy; and

7 (B)(i) uses mechanical, electrochemical,
8 thermal, electrolysis, or other processes to convert
9 and store electric energy that was generated at
10 an earlier time for use at a later time; or

11 (ii) stores energy in an electric, thermal, or
12 gaseous state for direct use for heating or cooling
13 at a later time in a manner that avoids the need
14 to use electricity or other fuel sources at that
15 later time, such as a grid-enabled water heater.

16 (3) *NATIONAL LABORATORY.*—The term “Na-
17 tional Laboratory” has the meaning given the term in
18 section 2 of the Energy Policy Act of 2005 (42 U.S.C.
19 15801).

20 (4) *SECRETARY.*—The term “Secretary” means
21 the Secretary of Energy, unless otherwise specified.

22 **SEC. 3. ENERGY STORAGE SYSTEM RESEARCH, DEVELOP-**
23 **MENT, AND DEPLOYMENT PROGRAM.**

24 (a) *ESTABLISHMENT.*—Not later than 180 days after
25 the date of enactment of this Act, the Secretary shall estab-

1 *lish a program, to be known as the “Energy Storage System*
 2 *Research, Development, and Deployment Program” (re-*
 3 *ferred to in this section as the “program”).*

4 (b) *INITIAL PROGRAM OBJECTIVES.—The program*
 5 *shall focus on research, development, and deployment of—*

6 (1) *energy storage systems designed to further the*
 7 *development of technologies—*

8 (A) *for large-scale commercial deployment;*

9 (B) *for deployment at cost targets estab-*
 10 *lished by the Secretary;*

11 (C) *for hourly and subhourly durations re-*
 12 *quired to provide reliability services to the grid;*

13 (D) *for daily durations, which have—*

14 (i) *the capacity to discharge energy for*
 15 *a minimum of 6 hours; and*

16 (ii) *a system lifetime of at least 20*
 17 *years under regular operation;*

18 (E) *for weekly or monthly durations, which*
 19 *have—*

20 (i) *the capacity to discharge energy for*
 21 *10 to 100 hours, at a minimum; and*

22 (ii) *a system lifetime of at least 20*
 23 *years under regular operation; and*

24 (F) *for seasonal durations, which have—*

- 1 (i) the capability to address seasonal
2 variations in supply and demand; and
- 3 (ii) a system lifetime of at least 20
4 years under regular operation;
- 5 (2) distributed energy storage technologies and
6 applications, including building-grid integration;
- 7 (3) transportation energy storage technologies
8 and applications, including vehicle-grid integration;
- 9 (4) cost-effective systems and methods for—
- 10 (A) the reclamation, recycling, and disposal
11 of energy storage materials, including lithium,
12 cobalt, nickel, and graphite; and
- 13 (B) the reuse and repurposing of energy
14 storage system technologies;
- 15 (5) advanced control methods for energy storage
16 systems;
- 17 (6) pumped hydroelectric energy storage systems
18 to advance—
- 19 (A) adoption of innovative technologies, in-
20 cluding—
- 21 (i) adjustable-speed, ternary, and other
22 new pumping and generating equipment de-
23 signs;
- 24 (ii) modular systems;

1 (iii) closed-loop systems, including
2 mines and quarries; and

3 (iv) other critical equipment and mate-
4 rials for pumped hydroelectric energy stor-
5 age, as determined by the Secretary; and

6 (B) reductions of equipment costs, civil
7 works costs, and construction times for pumped
8 hydroelectric energy storage projects, with the
9 goal of reducing those costs by 50 percent;

10 (7) models and tools to demonstrate the benefits
11 of energy storage to—

12 (A) power and water supply systems;

13 (B) electric generation portfolio optimiza-
14 tion; and

15 (C) expanded deployment of other renewable
16 energy technologies, including in hybrid energy
17 storage systems; and

18 (8) energy storage use cases from individual and
19 combination technology applications, including value
20 from various-use cases and energy storage services.

21 (c) *TESTING AND VALIDATION.*—In coordination with
22 1 or more National Laboratories, the Secretary shall accel-
23 erate the development, standardized testing, and validation
24 of energy storage systems under the program by developing
25 testing and evaluation methodologies for—

1 (1) *storage technologies, controls, and power elec-*
2 *tronics for energy storage systems under a variety of*
3 *operating conditions;*

4 (2) *standardized and grid performance testing*
5 *for energy storage systems, materials, and technologies*
6 *during each stage of development, beginning with the*
7 *research stage and ending with the deployment stage;*

8 (3) *reliability, safety, and durability testing*
9 *under standard and evolving duty cycles; and*

10 (4) *accelerated life testing protocols to predict es-*
11 *timated lifetime metrics with accuracy.*

12 (d) *PERIODIC EVALUATION OF PROGRAM OBJEC-*
13 *TIVES.—Not less frequently than once every calendar year,*
14 *the Secretary shall evaluate and, if necessary, update the*
15 *program objectives to ensure that the program continues to*
16 *advance energy storage systems toward widespread commer-*
17 *cial deployment by lowering the costs and increasing the*
18 *duration of energy storage resources.*

19 (e) *ENERGY STORAGE STRATEGIC PLAN.—*

20 (1) *IN GENERAL.—The Secretary shall develop a*
21 *10-year strategic plan for the program, and update*
22 *the plan, in accordance with this subsection.*

23 (2) *CONTENTS.—The strategic plan developed*
24 *under paragraph (1) shall—*

1 (A) be coordinated with and integrated
2 across other relevant offices in the Department;

3 (B) to the extent practicable, include
4 metrics that can be used to evaluate storage tech-
5 nologies;

6 (C) identify Department programs that—

7 (i) support the research and develop-
8 ment activities described in subsection (b)
9 and the demonstration projects under sec-
10 tion 4; and

11 (ii)(I) do not support the activities or
12 projects described in clause (i); but

13 (II) are important to the development
14 of energy storage systems and the mission of
15 the Department, as determined by the Sec-
16 retary;

17 (D) include expected timelines for—

18 (i) the accomplishment of relevant ob-
19 jectives under current programs of the De-
20 partment relating to energy storage systems;
21 and

22 (ii) the commencement of any new ini-
23 tiatives within the Department relating to
24 energy storage systems to accomplish those
25 objectives; and

1 (E) incorporate relevant activities described
2 in the Grid Modernization Initiative Multi-Year
3 Program Plan.

4 (3) *SUBMISSION TO CONGRESS.*—Not later than
5 180 days after the date of enactment of this Act, the
6 Secretary shall submit to the Committee on Energy
7 and Natural Resources of the Senate and the Commit-
8 tees on Energy and Commerce and Science, Space,
9 and Technology of the House of Representatives the
10 strategic plan developed under paragraph (1).

11 (4) *UPDATES TO PLAN.*—The Secretary—

12 (A) shall annually review the strategic plan
13 developed under paragraph (1); and

14 (B) may periodically revise the strategic
15 plan as appropriate.

16 (f) *LEVERAGING OF RESOURCES.*—The program may
17 be led by a specific office of the Department, but shall be
18 cross-cutting in nature, so that in carrying out activities
19 under the program, the Secretary (or a designee of the Sec-
20 retary charged with leading the program) shall leverage ex-
21 isting Federal resources, including, at a minimum, the ex-
22 pertise and resources of—

23 (1) the Office of Electricity Delivery and Energy
24 Reliability;

1 (2) *the Office of Energy Efficiency and Renew-*
2 *able Energy, including the Water Power Technologies*
3 *Office; and*

4 (3) *the Office of Science, including—*

5 (A) *the Basic Energy Sciences Program;*

6 (B) *the Advanced Scientific Computing Re-*
7 *search Program;*

8 (C) *the Biological and Environmental Re-*
9 *search Program; and*

10 (4) *the Electricity Storage Research Initiative*
11 *established under section 975 of the Energy Policy*
12 *Act of 2005 (42 U.S.C. 16315).*

13 (g) *PROTECTING PRIVACY AND SECURITY.—In car-*
14 *rying out this section, the Secretary shall identify, incor-*
15 *porate, and follow best practices for protecting the privacy*
16 *of individuals and businesses and the respective sensitive*
17 *data of the individuals and businesses, including by man-*
18 *aging privacy risk and implementing the Fair Information*
19 *Practice Principles of the Federal Trade Commission for*
20 *the collection, use, disclosure, and retention of individual*
21 *electric consumer information in accordance with the Office*
22 *of Management and Budget Circular A–130 (or successor*
23 *circulars).*

1 **SEC. 4. ENERGY STORAGE DEMONSTRATION PROJECTS;**
2 **PILOT GRANT PROGRAM.**

3 (a) *DEMONSTRATION PROJECTS.*—Not later than Sep-
4 tember 30, 2023, the Secretary shall, to the maximum extent
5 practicable, enter into agreements to carry out not fewer
6 than 5 energy storage system demonstration projects, in-
7 cluding at least 1 energy storage system demonstration
8 project designed to further the development of technologies
9 described in subparagraph (E) or (F) of section 3(b)(1).

10 (b) *ENERGY STORAGE PILOT GRANT PROGRAM.*—

11 (1) *DEFINITION OF ELIGIBLE ENTITY.*—In this
12 subsection, the term “eligible entity” means—

13 (A) a State energy office (as defined in sec-
14 tion 124(a) of the Energy Policy Act of 2005 (42
15 U.S.C. 15821(a));

16 (B) an Indian tribe (as defined in section
17 4 of the Native American Housing Assistance
18 and Self-Determination Act of 1996 (25 U.S.C.
19 4103);

20 (C) a tribal organization (as defined in sec-
21 tion 3765 of title 38, United States Code);

22 (D) an institution of higher education (as
23 defined in section 101 of the Higher Education
24 Act of 1965 (20 U.S.C. 1001));

25 (E) an electric utility, including—

26 (i) an electric cooperative;

1 (ii) a political subdivision of a State,
2 such as a municipally owned electric util-
3 ity, or any agency, authority, corporation,
4 or instrumentality of a State political sub-
5 division; and

6 (iii) an investor-owned utility; and

7 (F) a private energy storage company that
8 is a small business concern (within the meaning
9 of section 3 of the Small Business Act (15 U.S.C.
10 632)).

11 (2) *ESTABLISHMENT.*—The Secretary shall estab-
12 lish a competitive grant program under which the
13 Secretary shall award grants to eligible entities to
14 carry out demonstration projects for pilot energy stor-
15 age systems.

16 (3) *SELECTION REQUIREMENTS.*—In selecting el-
17 igible entities to receive a grant under paragraph (2),
18 the Secretary shall, to the maximum extent prac-
19 ticable—

20 (A) ensure regional diversity among eligible
21 entities awarded grants, including ensuring par-
22 ticipation of eligible entities that are rural
23 States and States with high energy costs;

24 (B) ensure that grants are awarded for
25 demonstration projects that—

1 (i) *expand on the existing technology*
2 *demonstration programs of the Department;*

3 (ii) *are designed to achieve 1 or more*
4 *of the objectives described in paragraph (4);*
5 *and*

6 (iii) *inject or withdraw energy from*
7 *the bulk power system, electric distribution*
8 *system, building energy system, or*
9 *microgrid (grid-connected or islanded mode)*
10 *where the project is located; and*

11 (C) *give consideration to proposals from eli-*
12 *gible entities for securing energy storage through*
13 *competitive procurement or contract for service.*

14 (4) *OBJECTIVES.—Each demonstration project*
15 *carried out by a grant awarded under paragraph (2)*
16 *shall have 1 or more of the following objectives:*

17 (A) *To improve the security of critical in-*
18 *frastructure and emergency response systems.*

19 (B) *To improve the reliability of trans-*
20 *mission and distribution systems, particularly*
21 *in rural areas, including high-energy-cost rural*
22 *areas.*

23 (C) *To optimize transmission or distribu-*
24 *tion system operation and power quality to defer*
25 *or avoid costs of replacing or upgrading electric*

1 *grid infrastructure, including transformers and*
2 *substations.*

3 *(D) To supply energy at peak periods of de-*
4 *mand on the electric grid or during periods of*
5 *significant variation of electric grid supply.*

6 *(E) To reduce peak loads of homes and*
7 *businesses.*

8 *(F) To improve and advance power conver-*
9 *sion systems.*

10 *(G) To provide ancillary services for grid*
11 *stability and management.*

12 *(H) To integrate renewable energy resource*
13 *production.*

14 *(I) To increase the feasibility of microgrids*
15 *(grid-connected or islanded mode).*

16 *(J) To enable the use of stored energy in*
17 *forms other than electricity to support the nat-*
18 *ural gas system and other industrial processes.*

19 *(K) To integrate fast charging of electric ve-*
20 *hicles.*

21 *(L) To improve energy efficiency.*

22 *(c) REPORTS.—Not less frequently than once every 2*
23 *years for the duration of the programs under subsections*
24 *(a) and (b), the Secretary shall submit to Congress and*

1 *make publicly available a report describing the performance*
2 *of those programs.*

3 (d) *NO PROJECT OWNERSHIP INTEREST.—The Fed-*
4 *eral Government shall not hold any equity or other owner-*
5 *ship interest in any energy storage system that is part of*
6 *a project under this section unless the holding is agreed to*
7 *by each participant of the project.*

8 **SEC. 5. LONG-DURATION DEMONSTRATION INITIATIVE AND**
9 **JOINT PROGRAM.**

10 (a) *DEFINITIONS.—In this section:*

11 (1) *DIRECTOR OF ARPA-E.—The term “Director*
12 *of ARPA-E” has the meaning given the term in sec-*
13 *tion 5012(a) of the America COMPETES Act (42*
14 *U.S.C. 16538(a)).*

15 (2) *DIRECTOR OF ESTCP.—The term “Director of*
16 *ESTCP” means the Secretary of Defense, acting*
17 *through the Director of the Environmental Security*
18 *Technology Certification Program of the Department*
19 *of Defense.*

20 (3) *INITIATIVE.—The term “Initiative” means*
21 *the demonstration initiative established under sub-*
22 *section (b).*

23 (4) *JOINT PROGRAM.—The term “Joint Pro-*
24 *gram” means the joint program established under*
25 *subsection (d).*

1 (5) *SECRETARY.*—*The term “Secretary” means*
2 *the Secretary of Energy, acting through the Director*
3 *of ARPA-E.*

4 (b) *ESTABLISHMENT OF INITIATIVE.*—*Not later than*
5 *180 days after the date of enactment of this Act, the Sec-*
6 *retary shall establish a demonstration initiative composed*
7 *of demonstration projects focused on the development of*
8 *long-duration energy storage technologies.*

9 (c) *SELECTION OF PROJECTS.*—*To the maximum ex-*
10 *tent practicable, in selecting demonstration projects to par-*
11 *ticipate in the Initiative, the Secretary shall—*

12 (1) *ensure a range of technology types;*

13 (2) *ensure regional diversity among projects; and*

14 (3) *consider bulk power level, distribution power*
15 *level, behind-the-meter, microgrid (grid-connected or*
16 *islanded mode), and off-grid applications.*

17 (d) *JOINT PROGRAM.*—

18 (1) *ESTABLISHMENT.*—*As part of the Initiative,*
19 *the Secretary, in consultation with the Director of*
20 *ESTCP, shall establish within the Department of En-*
21 *ergy a joint program to carry out projects—*

22 (A) *to demonstrate promising long-duration*
23 *energy storage technologies at different scales;*
24 *and*

1 (B) to help new, innovative long-duration
2 energy storage technologies become commercially
3 viable.

4 (2) *MEMORANDUM OF UNDERSTANDING.*—Not
5 later than 200 days after the date of enactment of this
6 Act, the Secretary shall enter into a memorandum of
7 understanding with the Director of ESTCP to admin-
8 ister the Joint Program.

9 (3) *INFRASTRUCTURE.*—In carrying out the
10 Joint Program, the Secretary and the Director of
11 ESTCP shall—

12 (A) use existing test-bed infrastructure at—

13 (i) Department of Energy facilities;

14 and

15 (ii) Department of Defense installa-
16 tions; and

17 (B) develop new infrastructure for identi-
18 fied projects, if appropriate.

19 (4) *GOALS AND METRICS.*—The Secretary and
20 the Director of ESTCP shall develop goals and
21 metrics for technological progress under the Joint
22 Program consistent with energy resilience and energy
23 security policies.

24 (5) *SELECTION OF PROJECTS.*—

1 (A) *IN GENERAL.*—*To the maximum extent*
2 *practicable, in selecting projects to participate in*
3 *the Joint Program, the Secretary and the Direc-*
4 *tor of ESTCP shall—*

5 (i) *ensure that projects are carried out*
6 *under conditions that represent a variety of*
7 *environments with different physical condi-*
8 *tions and market constraints; and*

9 (ii) *ensure an appropriate balance*
10 *of—*

11 (I) *larger, higher-cost projects;*

12 *and*

13 (II) *smaller, lower-cost projects.*

14 (B) *PRIORITY.*—*In carrying out the Joint*
15 *Program, the Secretary and the Director of*
16 *ESTCP shall give priority to demonstration*
17 *projects that—*

18 (i) *make available to the public project*
19 *information that will accelerate deployment*
20 *of long-duration energy storage technologies;*
21 *and*

22 (ii) *will be carried out in the field.*

23 **SEC. 6. TECHNICAL AND PLANNING ASSISTANCE PROGRAM.**

24 (a) *DEFINITIONS.*—*In this section:*

1 (1) *ELIGIBLE ENTITY.*—The term “eligible enti-
2 ty” means—

3 (A) *an electric cooperative;*

4 (B) *a political subdivision of a State, such*
5 *as a municipally owned electric utility, or any*
6 *agency, authority, corporation, or instrumen-*
7 *tality of a State political subdivision;*

8 (C) *a not-for-profit entity that is in a part-*
9 *nership with not less than 6 entities described in*
10 *subparagraph (A) or (B); and*

11 (D) *an investor-owned utility.*

12 (2) *PROGRAM.*—The term “program” means the
13 *technical and planning assistance program estab-*
14 *lished under subsection (b)(1).*

15 (b) *ESTABLISHMENT.*—

16 (1) *IN GENERAL.*—The Secretary shall establish
17 *a technical and planning assistance program to assist*
18 *eligible entities in identifying, evaluating, planning,*
19 *designing, and developing processes to procure energy*
20 *storage systems.*

21 (2) *ASSISTANCE AND GRANTS.*—Under the pro-
22 *gram, the Secretary shall—*

23 (A) *provide technical and planning assist-*
24 *ance, including disseminating information, di-*
25 *rectly to eligible entities; and*

1 (B) award grants to eligible entities to con-
2 tract to obtain technical and planning assistance
3 from outside experts.

4 (3) FOCUS.—In carrying out the program, the
5 Secretary shall focus on energy storage system projects
6 that have the greatest potential for—

7 (A) strengthening the reliability and resil-
8 iency of energy infrastructure;

9 (B) reducing the cost of energy storage sys-
10 tems;

11 (C) improving the feasibility of microgrids
12 (grid-connected or islanded mode), particularly
13 in rural areas, including high energy cost rural
14 areas;

15 (D) reducing consumer electricity costs; or

16 (E) maximizing local job creation.

17 (c) TECHNICAL AND PLANNING ASSISTANCE.—

18 (1) IN GENERAL.—Technical and planning as-
19 sistance provided under the program shall include as-
20 sistance with 1 or more of the following activities re-
21 lating to energy storage systems:

22 (A) Identification of opportunities to use
23 energy storage systems.

24 (B) Feasibility studies to assess the poten-
25 tial for development of new energy storage sys-

1 *tems or improvement of existing energy storage*
2 *systems.*

3 *(C) Assessment of technical and economic*
4 *characteristics, including a cost-benefit analysis.*

5 *(D) Utility interconnection.*

6 *(E) Permitting and siting issues.*

7 *(F) Business planning and financial anal-*
8 *ysis.*

9 *(G) Engineering design.*

10 *(H) Resource adequacy planning.*

11 *(I) Resilience planning and valuation.*

12 *(2) EXCLUSION.—Technical and planning assist-*
13 *ance provided under the program shall not be used to*
14 *pay any person for influencing or attempting to in-*
15 *fluence an officer or employee of any Federal, State,*
16 *or local agency, a Member of Congress, an employee*
17 *of a Member of Congress, a State or local legislative*
18 *body, or an employee of a State or local legislative*
19 *body.*

20 *(d) INFORMATION DISSEMINATION.—The information*
21 *disseminated under subsection (b)(2)(A) shall include—*

22 *(1) information relating to the topics described*
23 *in subsection (c)(1), including case studies of success-*
24 *ful examples;*

1 (2) *computational tools or software for assess-*
2 *ment, design, and operation and maintenance of en-*
3 *ergy storage systems;*

4 (3) *public databases that track existing and*
5 *planned energy storage systems;*

6 (4) *best practices for the utility and grid oper-*
7 *ator business processes associated with the topics de-*
8 *scribed in subsection (c)(1); and*

9 (5) *relevant State policies or regulations associ-*
10 *ated with the topics described in subsection (c)(1).*

11 *(e) APPLICATIONS.—*

12 (1) *IN GENERAL.—The Secretary shall seek ap-*
13 *plications for the program—*

14 (A) *on a competitive, merit-reviewed basis;*

15 *and*

16 (B) *on a periodic basis, but not less fre-*
17 *quently than once every 12 months.*

18 (2) *APPLICATION.—An eligible entity desiring to*
19 *apply for the program shall submit to the Secretary*
20 *an application at such time, in such manner, and*
21 *containing such information as the Secretary may re-*
22 *quire, including whether the eligible entity is apply-*
23 *ing for—*

24 (A) *direct technical or planning assistance*
25 *under subsection (b)(2)(A); or*

1 (B) a grant under subsection (b)(2)(B).

2 (3) *PRIORITIES.*—*In selecting eligible entities for*
3 *technical and planning assistance under the program,*
4 *the Secretary shall give priority to eligible entities de-*
5 *scribed in subparagraphs (A) and (B) of subsection*
6 *(a)(1).*

7 (f) *REPORTS.*—*The Secretary shall submit to Congress*
8 *and make available to the public—*

9 (1) *not less frequently than once every 2 years,*
10 *a report describing the performance of the program,*
11 *including a synthesis and analysis of any informa-*
12 *tion the Secretary requires grant recipients to provide*
13 *to the Secretary as a condition of receiving a grant;*
14 *and*

15 (2) *on termination of the program, an assess-*
16 *ment of the success of, and education provided by, the*
17 *measures carried out by eligible entities under the*
18 *program.*

19 (g) *COST-SHARING.*—*Activities under this section shall*
20 *be subject to the cost-sharing requirements under section*
21 *988 of the Energy Policy Act of 2005 (42 U.S.C. 16352).*

1 **SEC. 7. ENERGY STORAGE MATERIALS RECYCLING PRIZE**
2 **COMPETITION.**

3 *Section 1008 of the Energy Policy Act of 2005 (42*
4 *U.S.C. 16396) is amended by adding at the end the fol-*
5 *lowing:*

6 *“(g) ENERGY STORAGE MATERIALS RECYCLING PRIZE*
7 *COMPETITION.—*

8 *“(1) DEFINITION OF CRITICAL ENERGY STORAGE*
9 *MATERIALS.—In this subsection, the term ‘critical en-*
10 *ergy storage materials’ includes—*

11 *“(A) lithium;*

12 *“(B) cobalt;*

13 *“(C) nickel;*

14 *“(D) graphite; and*

15 *“(E) any other material determined by the*
16 *Secretary to be critical to the continued growing*
17 *supply of energy storage resources.*

18 *“(2) PRIZE AUTHORITY.—*

19 *“(A) IN GENERAL.—As part of the program*
20 *established under subsection (a), the Secretary*
21 *shall establish an award program, to be known*
22 *as the ‘Energy Storage Materials Recycling Prize*
23 *Competition’ (referred to in this subsection as*
24 *the ‘program’), under which the Secretary shall*
25 *carry out prize competitions and make awards*

1 to advance the recycling of critical energy stor-
2 age materials.

3 “(B) *FREQUENCY.*—To the maximum extent
4 practicable, the Secretary shall carry out a com-
5 petition under the program not less frequently
6 than once every calendar year.

7 “(3) *ELIGIBILITY.*—

8 “(A) *IN GENERAL.*—To be eligible to win a
9 prize under the program, an individual or enti-
10 ty—

11 “(i) shall have complied with the re-
12 quirements of the competition as described
13 in the announcement for that competition
14 published in the *Federal Register* by the
15 Secretary under paragraph (6);

16 “(ii) in the case of a private entity,
17 shall be incorporated in the United States
18 and maintain a primary place of business
19 in the United States;

20 “(iii) in the case of an individual,
21 whether participating singly or in a group,
22 shall be a citizen of, or an alien lawfully
23 admitted for permanent residence in, the
24 United States.

1 “(B) *EXCLUSIONS.*—*The following entities*
2 *and individuals shall not be eligible to win a*
3 *prize under the program:*

4 “(i) *A Federal entity.*

5 “(ii) *A Federal employee (including an*
6 *employee of a National Laboratory) acting*
7 *within the scope of employment.*

8 “(4) *AWARDS.*—*In carrying out the program, the*
9 *Secretary shall award cash prizes, in amounts to be*
10 *determined by the Secretary, to each individual or en-*
11 *tity selected through a competitive process to develop*
12 *advanced methods or technologies to recycle critical*
13 *energy storage materials from energy storage systems.*

14 “(5) *CRITERIA.*—

15 “(A) *IN GENERAL.*—*The Secretary shall es-*
16 *tablish objective, merit-based criteria for award-*
17 *ing the prizes in each competition carried out*
18 *under the program.*

19 “(B) *REQUIREMENTS.*—*The criteria estab-*
20 *lished under subparagraph (A) shall prioritize*
21 *advancements in methods or technologies that*
22 *present the greatest potential for large-scale com-*
23 *mercial deployment.*

24 “(C) *CONSULTATION.*—*In establishing cri-*
25 *teria under subparagraph (A), the Secretary*

1 *shall consult with appropriate members of pri-*
2 *vate industry involved in the commercial deploy-*
3 *ment of energy storage systems.*

4 “(6) *ADVERTISING AND SOLICITATION OF COM-*
5 *PETITORS.—*

6 “(A) *IN GENERAL.—The Secretary shall an-*
7 *nonce each prize competition under the pro-*
8 *gram by publishing a notice in the Federal Reg-*
9 *ister.*

10 “(B) *REQUIREMENTS.—Each notice pub-*
11 *lished under subparagraph (A) shall describe the*
12 *essential elements of the competition, such as—*

13 “(i) *the subject of the competition;*

14 “(ii) *the duration of the competition;*

15 “(iii) *the eligibility requirements for*
16 *participation in the competition;*

17 “(iv) *the process for participants to*
18 *register for the competition;*

19 “(v) *the amount of the prize; and*

20 “(vi) *the criteria for awarding the*
21 *prize.*

22 “(7) *JUDGES.—*

23 “(A) *IN GENERAL.—For each prize competi-*
24 *tion under the program, the Secretary shall as-*
25 *semble a panel of qualified judges to select the*

1 *winner or winners of the competition on the*
2 *basis of the criteria established under paragraph*
3 *(5).*

4 “(B) *SELECTION.*—*The judges for each com-*
5 *petition shall include appropriate members of*
6 *private industry involved in the commercial de-*
7 *ployment of energy storage systems.*

8 “(C) *CONFLICTS.*—*An individual may not*
9 *serve as a judge in a prize competition under the*
10 *program if the individual, the spouse of the indi-*
11 *vidual, any child of the individual, or any other*
12 *member of the household of the individual—*

13 *“(i) has a personal or financial inter-*
14 *est in, or is an employee, officer, director, or*
15 *agent of, any entity that is a registered par-*
16 *ticipant in the prize competition for which*
17 *the individual will serve as a judge; or*

18 *“(ii) has a familial or financial rela-*
19 *tionship with a registered participant in*
20 *the prize competition for which the indi-*
21 *vidual will serve as a judge.*

22 “(8) *REPORT TO CONGRESS.*—*Not later than 60*
23 *days after the date on which the first prize is award-*
24 *ed under the program, and annually thereafter, the*
25 *Secretary shall submit to Congress a report that—*

1 “(A) identifies each award recipient;

2 “(B) describes the advanced methods or
3 technologies developed by each award recipient;
4 and

5 “(C) specifies actions being taken by the De-
6 partment toward commercial application of all
7 methods or technologies with respect to which a
8 prize has been awarded under the program.

9 “(9) ANTI-DEFICIENCY ACT.—The Secretary shall
10 carry out the program in accordance with section
11 1341 of title 31, United States Code (commonly re-
12 ferred to as the ‘Anti-Deficiency Act’).

13 “(10) AUTHORIZATION OF APPROPRIATIONS.—
14 There is authorized to be appropriated to carry out
15 this subsection \$10,000,000 for each of fiscal years
16 2020 through 2024, to remain available until ex-
17 pended.”.

18 **SEC. 8. REGULATORY ACTIONS TO ENCOURAGE ENERGY**

19 **STORAGE DEPLOYMENT.**

20 (a) DEFINITIONS.—In this section:

21 (1) COMMISSION.—The term “Commission”
22 means the Federal Energy Regulatory Commission.

23 (2) ELECTRIC STORAGE RESOURCE.—The term
24 “electric storage resource” means a resource capable of
25 receiving electric energy from the grid and storing

1 *that electric energy for later injection back into the*
2 *grid.*

3 **(b) REGULATORY ACTION.—**

4 **(1) IN GENERAL.—***Not later than 1 year after*
5 *the date of enactment of this Act, the Commission*
6 *shall issue a regulation to identify the eligibility of,*
7 *and process for, electric storage resources—*

8 **(A)** *to receive cost recovery through Com-*
9 *mission-regulated rates for the transmission of*
10 *electric energy in interstate commerce; and*

11 **(B)** *that receive cost recovery under sub-*
12 *paragraph (A) to receive compensation for other*
13 *services (such as the sale of energy, capacity, or*
14 *ancillary services) without regard to whether*
15 *those services are provided concurrently with the*
16 *transmission service described in subparagraph*
17 **(A).**

18 **(2) PROHIBITION OF DUPLICATE RECOVERY.—**
19 *Any regulation issued under paragraph (1) shall pre-*
20 *clude the receipt of unjust and unreasonable double*
21 *recovery for electric storage resources providing serv-*
22 *ices described in subparagraphs (A) and (B) of that*
23 *paragraph.*

24 **(c) ELECTRIC STORAGE RESOURCES TECHNICAL CON-**
25 **ERENCE.—**

1 (1) *IN GENERAL.*—Not later than 180 days after
2 the date of enactment of this Act, the Commission
3 shall convene a technical conference on the potential
4 for electric storage resources to improve the operation
5 of electric systems.

6 (2) *REQUIREMENTS.*—The technical conference
7 under paragraph (1) shall—

8 (A) identify opportunities for further con-
9 sideration of electric storage resources in regional
10 and interregional transmission planning proc-
11 esses within the jurisdiction of the Commission;

12 (B) identify all energy, capacity, and ancil-
13 lary service products, market designs, or rules
14 that—

15 (i) are within the jurisdiction of the
16 Commission; and

17 (ii) enable and compensate for the use
18 of electric storage resources that improve the
19 operation of electric systems;

20 (C) examine additional products, market
21 designs, or rules that would enable and com-
22 pensate for the use of electric storage resources
23 for improving the operation of electric systems;
24 and

1 (D) examine the functional value of electric
2 storage resources at the transmission and dis-
3 tribution system interface for purposes of pro-
4 viding electric system reliability.

5 **SEC. 9. COORDINATION.**

6 To the maximum extent practicable, the Secretary
7 shall coordinate the activities under this Act (including ac-
8 tivities conducted pursuant to the amendments made by
9 this Act) among the offices and employees of the Depart-
10 ment, other Federal agencies, and other relevant entities—

11 (1) to ensure appropriate collaboration; and

12 (2) to avoid unnecessary duplication of those ac-
13 tivities.

14 **SEC. 10. AUTHORIZATION OF APPROPRIATIONS.**

15 There are authorized to be appropriated—

16 (1) to carry out section 3, \$100,000,000 for each
17 of fiscal years 2020 through 2024, to remain available
18 until expended;

19 (2) to carry out section 4, \$100,000,000 for each
20 of fiscal years 2020 through 2024, to remain available
21 until expended;

22 (3) to carry out section 5, \$50,000,000 for each
23 of fiscal years 2020 through 2024, to remain available
24 until expended; and

1 *(4) to carry out section 6, \$20,000,000 for each*
2 *of fiscal years 2020 through 2024, to remain available*
3 *until expended.*

Amend the title so as to read: “A bill to support re-
search, development, and demonstration programs relat-
ing to energy storage systems, and for other purposes.”.

Calendar No. 255

116TH CONGRESS
1ST Session

S. 1602

[Report No. 116-135]

A BILL

To amend the United States Energy Storage Competitiveness Act of 2007 to establish a research, development, and demonstration program for grid-scale energy storage systems, and for other purposes.

OCTOBER 22, 2019

Reported with an amendment and an amendment to the
title